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ABSTRACT

A program to train administrators, faculty, instructional designers, media specialists and computer programers in use of a new PLATO IV computer system for Florida State University is outlined and discussed. Three major areas of competence are identified: selection of appropriate PLATO materials, design of courseware, and production and TUTOR programing of courseware materials. Levels of competence required by different trainees in each area are assessed. Guidelines for training in selection, design and production are described. Program has been pilot-tested and further changes are being made. (SK)

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Training of Personnel for the Florida PLATO Projects

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Introduction

The Florida State University has recently contracted to purchase the computer hardware and software necessary to support the installation and implementation of a PLATO IV Computer System in Tallahassee. This action results in the establishment of the first independent PLATO IV System outside of the University of Illinois and the Control Data Corporation. The PLATO IV System is an advanced computer-based instructional system which provides a wide range of display and student response analysis capabilities not previously available.

In order to prepare the appropriate personnel to use such a unique and innovative system effectively, an extensive training effort is required. A partial list of those who will need some level of training includes administrators, faculty, computer operators, computer systems analysts, maintenance technicians, instructional designers, media specialists, computer programmers and student users. The purpose of this paper is to describe a PLATO Training Program which is being developed by the Center for Educational Design (CED), Florida State University. The training of the computer operators, system analysts and maintenance technicians will not be addressed in this report. Their training is the responsibility of the FSU Computer Center and Control Data Corporation.

The training program to be described in this paper is being developed principly to assist administrators, faculty, instructional designers, media specialists and computer programmers to use the PLATO System effectively. An overview of the relationship between the different types of trainees, the areas of competence, and the levels of competence required will be described in the first section. Each of the areas of

competence and their associated training materials will be described in the following sections. The final section will outline the training which has already been completed and the plans for future training activities. A Syllabus of the Training Program is available on request (Merrill, 1975b).

Scope of the Training Program

The PLATO training program is divided into three major Areas of Competence:

1. The selection of appropriate PLATO applications in the instructional design effort;
2. The design of PLATO courseware materials; and
3. Production and TUTOR programming of PLATO courseware materials.

For each one of these Areas of Competence there are three Levels of Competence that a trainee could achieve:

1. Level I, Conceptual Knowledge--The trainee will be able to compose rationally complete statements concerning the characteristics of the PLATO System.
2. Level II, Knowledge Application--The trainee will be able to conceptualize and apply knowledge and skills in an optimized environment.
3. Level III, Skill Level--The trainee will be able to perform skills in a "real world" environment. (This level is obtained after some experience on the job.)

These different Areas and Levels of Competence reflect the differing needs of different types of personnel. Table 1 shows the specific

Levels of Competence required by different Trainees in each of the three competency areas.

Table 1
Levels of Competence
Required by Different Trainees
in Three Competency Areas

TRAINEE	Competency Areas		
	1 Selection	2 Design	3 Production
Administrator	I	-	-
Content Faculty	III	II	I
Instructional Design Faculty	III	III	II
Media Specialist	I	II	III
PLATO Programmer	I	I	III
Content Graduate Assist.	III	II	I
Instructional Design Grad. Assistant	III	III	I

Thus, a PLATO programmer would need to have a Level III (Skill level) competence in the production (programming) of PLATO lessons. On the other hand, a content faculty member would only need a Level I (knowledge) competence in production. These training requirement estimates will be refined as we gain additional experience with the PLATO System.

Media Selection and PLATO

The PLATO System has a wide range of capabilities which makes it a very versatile instructional medium. However, PLATO obviously will not meet every possible instructional need. At the present time it is a very expensive system, and many other media are less expensive and equally or more effective than PLATO for many instructional applications.

The first major competency area addressed by the PLATO training Program is that of Media Selection. Under what conditions would PLATO be the most efficient and effective medium as compared to other media such as regular text books, motion pictures, audio tapes, laboratory equipment, the instructor, or other available computer terminals? An individual trained at Level II (application) in this competency area should be able to select the most appropriate media given a specific instructional event.

Before the appropriate media is selected, the instructional development team usually goes through several prerequisite design activities. First, the overall goals and subgoals of the course are specified in terms of written behavioral objectives. These goals or objectives are then analyzed to determine necessary prerequisites and the most appropriate instructional sequence. Evaluation instruments are developed which are directly related to the objectives. At this juncture the instructional development team has determined exactly what the students should learn (objectives) and how to determine when it has been learned (evaluation). The next steps entail the identification of the instructional events necessary to assist the student in achieving the desired learning outcomes. (See Gagne´ and Briggs (1974) for a detailed discussion

of the different types of instructional events required for various learning outcomes.)

For each instructional event, the team identifies:

1. the type of stimuli to be presented to the student,
2. the type of response to be required by the student, and
3. the type of response analysis capability required in order to make subsequent instructional decisions.

A Media Selection Chart such as that shown in Figure 1 may then be used as a guide in selecting the media (Merrill, 1975a). The cells of the matrix contain the letters G, F, and P or are left blank. If a cell contains the letter "G," the media category listed at the top of the column is considered to have the capability and does a "good" job of presenting the stimuli, recording the response, or analyzing the response listed at the left of the row. The letter "F" indicates that the media does a fair job, while the letter "P" means that the media does a poor job. A blank cell implies that the media does not have the required capability. That media or combination of media is identified which has the capabilities required to present the stimuli and analyze the response with minimum distortion of the presentation form (Tosti & Ball, 1969). When several media options would be appropriate, the selection should be based on other practical considerations such as learner characteristics, media availability and cost, and packaging constraints.

Inasmuch as PLATO is currently a relatively expensive resource and few terminals are available, every effort should be made to use PLATO for those applications where its unique capabilities are essential. An extensive study of the capabilities of PLATO as compared to other media

	CRT	PLATO	VIDEO	SLIDE	AUDIO	INSTRUCTOR	PRINT
Stimuli							
A. Real World Objects							
B. Pictorial							
1. Still		G	G	G			G
2. Motion			G				
C. Alphanumberics (verbal)							
1. Audio		G	G		G	G	
2. Visual	G	G	G	G			G
D. Symbolic							
1. Still	P	G	G	G			G
2. Animated		F	G	P			P
E. Sounds		F	G		G	P	
Response Recording							
A. Covert							
B. Selective	G	G	(G)	(G)		P	G
C. Constructed	G	G	(G)	(G)		P	G
D. Vocal			(G)		(G)	P	
E. Motor			(G)	(P)		P	
F. Affective	P	P	(P)	(P)	P	P	P
Response Analysis							
A. Covert							
B. Selective	G	G				G	
C. Constructed	P	F				G	
D. Vocal						G	
E. Motor						G	
F. Affective	P	P				F	

Figure 1 - Media Selection Matrix (From Merrill, 1975a)

has been conducted by the Center for Educational Design. The results of this study are being incorporated into the training materials for the Media Selection competency area.

In brief, PLATO should be used where the learning activity requires considerable interaction between the student and the instructional medium. In order for a given medium to interact with the student, there must be some mechanism for analyzing and interpreting the student's response. PLATO's unique combination of stimulus presentation and response analysis capabilities make it an appropriate medium when the learning activity requires any of the following:

1. Analysis of complex constructed responses (Natural language processing);
2. Analysis of student responses and a coordinated random access presentation of several stimuli such as still pictures, audio sounds, and visual words;
3. Analysis of student responses and the presentation of special symbols (non alphanumeric);
4. Analysis of student responses and the presentation of graphic displays (drawings, figures, charts, diagrams, graphs, etc.); or
5. Analysis of student responses and the presentation of animated displays.

PLATO can be used in many other ways such as displaying the text of a book, presently a slide/tape module, or simulating a programmed text. However, there are less expensive media which could be used for those applications.

The learning activities corresponding to the Media Selection competency are specified in Unit I of the PLATO Training Program Syllabus. In addition to studying appropriate references, the Trainee is asked to attend a demonstration of the PLATO System and to execute and analyze several PLATO lessons which show apppropriate and inappropriate applications of the medium. A small group session is scheduled to allow Trainees to discuss their analysis of appropriate and inappropriate applications with each other and with a specialist.

The Design of PLATO Courseware

The second major competency area addressed by the PLATO Training Program entails the design of PLATO Courseware. An individual trained at Level II (application) in this competency area should be able to lay out in written form the specifications for a PLATO lesson. These specifications should be in sufficient detail that a TUTOR programmer could prepare the corresponding TUTOR lesson with minimum verbal instructions.

Through the use of the team approach to instructional design, we assume that it will not be necessary for a content specialist to be skilled in the TUTOR programming language (See Table 1). However, the content faculty member must be able to communicate his ideas to the computer programmer. In order to minimize the number of iterations required to develop an acceptable PLATO lesson, the content faculty must be aware of the specific capabilities and limitations of the PLATO System. He should also have a general notion of the components of a PLATO lesson and how they are interrelated.

A PLATO lesson is a set of instructions to the computer written in a language called TUTOR. These instructions are referred to as TUTOR commands. These commands may be classified in terms of their purpose or function as listed below:

1. Commands which describe what is to be presented or displayed on the plasma panel or screen;
2. Commands which analyze the student's response and determine or judge whether the response was correct or incorrect;
3. Commands which determine the sequencing of displays based on specified decision rules;
4. Commands which perform simple or complex calculations; and
5. Commands which specify the collection of student response data for subsequent analysis.

The content faculty member will be trained to describe his ideas for a PLATO lesson in terms of the above functions. He will learn to use PLATO Lesson Planning Forms similar to Figure 2. Through the use of these forms he will specify the nature of the computer displays, the sequencing contingent upon the student's response, any necessary calculations, and the student response data to be collected. The Planning Form serves as the "blueprint" for the PLATO lesson which may be programmed into the TUTOR language by a computer programmer.

Unit II of the Syllabus describes the learning activities corresponding to the competency area: Design of PLATO Courseware. The Trainee is required to outline a simple PLATO lesson which incorporates each of the major functional components listed above.

PLATO Lesson Planning Sheet

Lesson:_____ Name: _____

Unit:_____ Purpose of Unit:

NEXT:_____

BACK:_____

HELP:_____

DATA:_____ Reach Here From:

LAB:_____

_____:_____

Instructions or Comments

Screen

Use back if necessary

Figure 2 - PLATO Lesson Planning Sheet

Production and TUTOR Programming

The third major competency area involves the production and TUTOR Programming of PLATO Courseware Materials. Inasmuch as we presently do not have facilities to produce microfiche or audio disks, no materials have been developed to train individuals in the production of these items. In the meantime, these items will be produced under contract by the University of Illinois.

The major emphasis of the PLATO training program, in terms of training time, is on the TUTOR programming language. All PLATO lessons must be written in the TUTOR language. Most PLATO lessons will be written by trained specialists in TUTOR. However, other members of the instructional development team will be asked to learn TUTOR to some Level of Competency (See Table 1). An individual trained at Level II (application) in TUTOR should be able to design, code, debug, and successfully execute a TUTOR lesson as specified on PLATO Lesson Planning Forms (See Figure 2).

The learning activities corresponding to the competency area of TUTOR programming are described in Units II through XI of the Syllabus. These learning activities incorporate portions of the following "off the shelf" printed manuals on the TUTOR language:

Ghesquiere, J., Davis, C., and Thompson, C. Introduction to TUTOR, Urbana, Illinois: CERL, 1974.

Sherwood, B. A., The TUTOR Language, Urbana, Illinois: CERL, June, 1974.

Avner, E. PLATO User's Memo, Urbana, Illinois: CERL, May, 1974.

CDC. TUTOR Reference Manual, Minneapolis: CDC, July 18, 1974.

The learning activities also include an instructional TUTOR lesson called "INTROTUTOR" and an on-line reference manual called lesson "AIDS." Both of these lessons were developed at the University of Illinois.

The Study Guide contains materials written at Florida State University to supplement the "off the shelf" materials. At the end of each unit the trainee is asked to write and execute a simple TUTOR lesson which requires the use of the knowledge and skills taught in the corresponding unit. The TUTOR lesson "IDD 632" was developed by the Center for Educational Design and demonstrates sample lessons corresponding to the programming assignments.

The final unit requires the trainee to demonstrate his or her proficiency in the TUTOR language by writing, coding, debugging, and successfully executing a complex TUTOR lesson. This TUTOR lesson should be an appropriate PLATO application and should require from 15-60 minutes of terminal time to execute in Student Mode.

Training Activities: Past and Future

The PLATO Training Program described in this report is still under development and formative evaluation. Many of the separate components of the Training Program have been used in training seminars with the Center for Educational Design staff and with specific individuals. An initial pilot testing of the entire PLATO Training Program was conducted during the Winter, 1975, academic quarter. Eighteen trainees participated in the initial pilot test. The results of the pilot test are being used to make necessary revisions in the Training program. The revised materials will be tested during the Summer, 1975, quarter.

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